

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C. 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 04 August 2000 (04.08.00)	
International application No. PCT/GB99/03879	Applicant's or agent's file reference SK/P10173PC
International filing date (day/month/year) 19 November 1999 (19.11.99)	Priority date (day/month/year) 19 November 1998 (19.11.98)
Applicant TAYLOR, Richard, Michael	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

16 June 2000 (16.06.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election
- ☒
- was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Juan Cruz Telephone No.: (41-22) 338.83.38
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PCT

国際調査報告

(法8条、法施行規則第40、41条)
[PCT18条、PCT規則43、44]

出願人又は代理人 の書類記号 SK00PCT74	今後の手続きについては、国際調査報告の送付通知様式(PCT/ISA/220) 及び下記5を参照すること。	
国際出願番号 PCT/JP00/05560	国際出願日 (日.月.年) 18.08.00	優先日 (日.月.年) 24.08.99
出願人(氏名又は名称) ソニー株式会社		

国際調査機関が作成したこの国際調査報告を法施行規則第41条(PCT18条)の規定に従い出願人に送付する。
この写しは国際事務局にも送付される。

この国際調査報告は、全部で 4 ページである。

☐ この調査報告に引用された先行技術文献の写しも添付されている。

1. 国際調査報告の基礎

a. 言語は、下記に示す場合を除くほか、この国際出願がされたものに基づき国際調査を行った。

☐ この国際調査機関に提出された国際出願の翻訳文に基づき国際調査を行った。

b. この国際出願は、ヌクレオチド又はアミノ酸配列を含んでおり、次の配列表に基づき国際調査を行った。

☐ この国際出願に含まれる書面による配列表

☐ この国際出願と共に提出されたフレキシブルディスクによる配列表

☐ 出願後に、この国際調査機関に提出された書面による配列表

☐ 出願後に、この国際調査機関に提出されたフレキシブルディスクによる配列表

☐ 出願後に提出した書面による配列表が出願時における国際出願の開示の範囲を超える事項を含まない旨の陳述書の提出があった。

☐ 書面による配列表に記載した配列とフレキシブルディスクによる配列表に記録した配列が同一である旨の陳述書の提出があった。

2. ☒ 請求の範囲の一部の調査ができない(第I欄参照)。

3. ☐ 発明の単一性が欠如している(第II欄参照)。

4. 発明の名称は ☒ 出願人が提出したものを承認する。

☐ 次に示すように国際調査機関が作成した。

5. 要約は ☒ 出願人が提出したものを承認する。

☐ 第III欄に示されているように、法施行規則第47条(PCT規則38.2(b))の規定により国際調査機関が作成した。出願人は、この国際調査報告の発送の日から1カ月以内にこの国際調査機関に意見を提出することができる。

6. 要約書とともに公表される図は、

第 9 図とする。 ☒ 出願人が示したとおりである。

☐ なし

☐ 出願人は図を示さなかった。

☐ 本図は発明の特徴を一層よく表している。

第Ⅰ欄 請求の範囲の一部の調査ができないときの意見（第1ページの2の続き）

法第8条第3項（PCT17条(2)(a)）の規定により、この国際調査報告は次の理由により請求の範囲の一部について作成しなかった。

1. ☐ 請求の範囲 _____ は、この国際調査機関が調査をすることを要しない対象に係るものである。つまり、
2. ☒ 請求の範囲 9, 57, 66-68 は、有意義な国際調査をすることができる程度まで所定の要件を満たしていない国際出願の部分に係るものである。つまり、
請求の範囲9には「上記窓部」と記載されているが、請求の範囲9で引用している請求の範囲1も含め、該記載以前に窓部に関する記載は無い。
請求の範囲57における「上記第2の接続端子」、請求の範囲66における「上記規制」という記載についても、該記載以前には述べられていない。
3. ☐ 請求の範囲 _____ は、従属請求の範囲であってPCT規則6.4(a)の第2文及び第3文の規定に従って記載されていない。

第Ⅱ欄 発明の単一性が欠如しているときの意見（第1ページの3の続き）

次に述べるようにこの国際出願に二以上の発明があるところの国際調査機関は認めた。

1. ☐ 出願人が必要な追加調査手数料をすべて期間内に納付したので、この国際調査報告は、すべての調査可能な請求の範囲について作成した。
2. ☐ 追加調査手数料を要求するまでもなく、すべての調査可能な請求の範囲について調査することができたので、追加調査手数料の納付を求めなかった。
3. ☐ 出願人が必要な追加調査手数料を一部のみしか期間内に納付しなかったため、この国際調査報告は、手数料の納付のあった次の請求の範囲のみについて作成した。
4. ☐ 出願人が必要な追加調査手数料を期間内に納付しなかったため、この国際調査報告は、請求の範囲の最初に記載されている発明に係る次の請求の範囲について作成した。

追加調査手数料の異議の申立てに関する注意

- ☐ 追加調査手数料の納付と共に出願人から異議申立てがあった。
- ☐ 追加調査手数料の納付と共に出願人から異議申立てがなかった。

A. 発明の属する分野の分類 (国際特許分類 (IPC))		
IntCl ⁷ G06K 17/00, G10K 15/02, G10L 19/00, H01R 13/629		
B. 調査を行った分野		
調査を行った最小限資料 (国際特許分類 (IPC))		
IntCl ⁷ G06K 17/00, G06K 19/00, G10L 19/00		
最小限資料以外の資料で調査を行った分野に含まれるもの		
日本国実用新案公報 1922-1996年 日本国公開実用新案公報 1971-2000年 日本国登録実用新案公報 1994-2000年 日本国実用新案登録公報 1996-2000年		
国際調査で使用した電子データベース (データベースの名称、調査に使用した用語)		
C. 関連すると認められる文献		
引用文献の カテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する 請求の範囲の番号
X	JP, 10-178691, A (ソニー株式会社) 30. 6月. 1998 (30. 06. 98) 段落番号【0015】 - 【0022】, 第2図	1, 3-4, 7, 48, 50, 53, 69
Y	段落番号【0015】 - 【0022】, 第2図	2, 5-6, 8, 12-13, 15-23, 25, 49, 51-52, 54, 56
<input checked="" type="checkbox"/> C欄の続きにも文献が列挙されている。 <input type="checkbox"/> パテントファミリーに関する別紙を参照。		
* 引用文献のカテゴリー 「A」 特に関連のある文献ではなく、一般的技術水準を示すもの 「E」 国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの 「L」 優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献 (理由を付す) 「O」 口頭による開示、使用、展示等に言及する文献 「P」 国際出願日前で、かつ優先権の主張の基礎となる出願日の後に公表された文献 「T」 国際出願日又は優先日後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの 「X」 特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの 「Y」 特に関連のある文献であって、当該文献と他の1以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの 「&」 同一パテントファミリー文献		
国際調査を完了した日	27. 11. 00	国際調査報告の発送日 05.12.00
国際調査機関の名称及びあて先 日本国特許庁 (ISA/JP) 郵便番号100-8915 東京都千代田区霞が関三丁目4番3号	特許庁審査官 (権限のある職員) 相崎 裕恒 電話番号 03-3581-1101 内線 3585	5N 2945

C (続き) 関連すると認められる文献		
引用文献の カテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する 請求の範囲の番号
A	段落番号【0015】-【0022】，第2図 (ファミリーなし)	10-11, 14, 24, 26-47, 55, 58-65
Y	JP, 11-52998, A (ソニー株式会社) 26. 2月. 1999 (26. 02. 99) 全文, 全図 & CN, 1222709, A & TW, 389914, A & KR, 99023427, A	2, 16-19, 49
Y	JP, 11-163984, A (株式会社デンソー) 18. 6月. 1999 (18. 06. 99) 段落番号【0014】，第5図 (ファミリーなし)	5-6, 51-52
Y	JP, 10-198772, A (日立製作所) 31. 7月. 1998 (31. 07. 98) 段落番号【0045】-【0048】，第5図 (ファミリーなし)	8, 12-13, 22-24, 25, 54, 56
Y	JP, 11-95867, A (株式会社東芝) 9. 4月. 1999 (09. 04. 99) 全文, 全図 (ファミリーなし)	13, 15-23, 25
Y	JP, 3-110566, U (日本電気株式会社) 13. 11月. 1991 (13. 11. 91) 全文, 全図 (ファミリーなし)	5, 19, 51
A	JP, 10-111917, A (オリンパス光学工業株式会社) 28. 4月. 1998 (28. 04. 98) 全文, 全図 (ファミリーなし)	1-8, 10-56, 58-65, 69
P, A	JP, 11-282500, A (オリンパス光学工業株式会社) 15. 10月. 1999 (15. 10. 99) 全文, 全図 (ファミリーなし)	1-8, 10-56, 58-65, 69
P, A	JP, 11-296199, A (有限会社ジェノイド・プロトデ ザイン) 29. 10月. 1999 (29. 10. 99) 全文, 全図 (ファミリーなし)	1-8, 10-56, 58-65, 69

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 99/03879	
A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G11B31/00 G11B25/04 G11C7/16	
According to International Patent Classification (IPC) or to both national classification and IPC	
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 G11B G11C	
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched	
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)	
C. DOCUMENTS CONSIDERED TO BE RELEVANT	
Category	Citation of document, with indication, where appropriate, of the relevant passages
Y	US 5 619 570 A (TSUTSUI KYOYA) 8 April 1997 (1997-04-08) abstract; figures 1-6 column 7, line 25 -column 10, line 37
Y	US 5 724 546 A (TSUTSUI KYOYA) 3 March 1998 (1998-03-03) abstract; figure 5 column 6, line 65 -column 7, line 5
A	GB 2 296 600 A (SONY CORP) 3 July 1996 (1996-07-03) abstract; figures 1-3 page 7, line 9 -page 13, line 5
	Relevant to claim No. 1-3, 7-9, 11, 13-20, 23-25 1-3, 7-9, 11, 13-20, 23-25 1-30
--/--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.	
<input checked="" type="checkbox"/> Patent family members are listed in annex.	
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "Z" document member of the same patent family	
Date of the actual completion of the international search 28 January 2000	Date of mailing of the international search report 04/02/2000
Name and mailing address of the ISA European Patent Office, P.O. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Pariset, N

INTERNATIONAL SEARCH REPORT

Int. l. Application No
 PCT/GB 99/03879

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 786 774 A (SONY CORP) 30 July 1997 (1997-07-30) abstract; figures 1-8 column 5, line 29 -column 8, line 28	1-30
P,A	DE 197 41 503 A (PONTIS MESTECHNIK GMBH) 1 April 1999 (1999-04-01) abstract; figure 1 column 3, line 49 -column 5, line 52	1-30
P,A	EP 0 957 489 A (POL TEUN VAN DE) 17 November 1999 (1999-11-17) abstract; figures 1-3 column 4, line 27 -column 7, line 16	1-30
P,A	EP 0 924 708 A (SAEHAN INFORMATION SYSTEM INC ;DIGITALCAST INC (KR)) 23 June 1999 (1999-06-23) abstract; figures 1,2 column 4, line 18 -column 6, line 19	1-30

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. l. Application No
 PCT/GB 99/03879

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5619570 A	08-04-1997	JP 6131371 A	13-05-1994
US 5724546 A	03-03-1998	JP 6251564 A	09-09-1994
GB 2296600 A	03-07-1996	US 5771330 A	23-06-1998
		GB 2326518 A,B	23-12-1998
		GB 2329752 A,B	31-03-1999
		WO 9605695 A	22-02-1996
EP 0786774 A	30-07-1997	JP 9265731 A	07-10-1997
		US 5870710 A	09-02-1999
DE 19741503 A	01-04-1999	AU 9441398 A	12-04-1999
		WO 9916075 A	01-04-1999
EP 0957489 A	17-11-1999	NONE	
EP 0924708 A	23-06-1999	CN 1218258 A	02-06-1999
		JP 11175099 A	02-07-1999

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference SK/P10173PC	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 99/ 03879	International filing date (day/month/year) 19/11/1999	(Earliest) Priority Date (day/month/year) 19/11/1998
Applicant MEMORY CORPORATION TECHNOLOGY LTD et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

6
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

/GB 99/03879

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G11B31/00 G11B25/04 G11C7/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B G11C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 619 570 A (TSUTSUI KYOYA) 8 April 1997 (1997-04-08) abstract; figures 1-6 column 7, line 25 -column 10, line 37 ---	1-3, 7-9, 11, 13-20, 23-25
Y	US 5 724 546 A (TSUTSUI KYOYA) 3 March 1998 (1998-03-03) abstract; figure 5 column 6, line 65 -column 7, line 5 ---	1-3, 7-9, 11, 13-20, 23-25
A	GB 2 296 600 A (SONY CORP) 3 July 1996 (1996-07-03) abstract; figures 1-3 page 7, line 9 -page 13, line 5 --- -/--	1-30

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

28 January 2000

Date of mailing of the international search report

04/02/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Pariset, N

INTERNATIONAL SEARCH REPORT

International Application No

/GB 99/03879

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 786 774 A (SONY CORP) 30 July 1997 (1997-07-30) abstract; figures 1-8 column 5, line 29 -column 8, line 28 ---	1-30
P,A	DE 197 41 503 A (PONTIS MESTECHNIK GMBH) 1 April 1999 (1999-04-01) abstract; figure 1 column 3, line 49 -column 5, line 52 ---	1-30
P,A	EP 0 957 489 A (POL TEUN VAN DE) 17 November 1999 (1999-11-17) abstract; figures 1-3 column 4, line 27 -column 7, line 16 ---	1-30
P,A	EP 0 924 708 A (SAEHAN INFORMATION SYSTEM INC ;DIGITALCAST INC (KR)) 23 June 1999 (1999-06-23) abstract; figures 1,2 column 4, line 18 -column 6, line 19 -----	1-30

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/GB 99/03879

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5619570	A	08-04-1997	JP 6131371	A	13-05-1994
US 5724546	A	03-03-1998	JP 6251564	A	09-09-1994
GB 2296600	A	03-07-1996	US 5771330	A	23-06-1998
			GB 2326518	A, B	23-12-1998
			GB 2329752	A, B	31-03-1999
			WO 9605695	A	22-02-1996
EP 0786774	A	30-07-1997	JP 9265731	A	07-10-1997
			US 5870710	A	09-02-1999
DE 19741503	A	01-04-1999	AU 9441398	A	12-04-1999
			WO 9916075	A	01-04-1999
EP 0957489	A	17-11-1999	NONE		
EP 0924708	A	23-06-1999	CN 1218258	A	02-06-1999
			JP 11175099	A	02-07-1999

REPLACED BY
ART 34 AMST

PATENT COOPERATION TREATY

PCT

REC'D 13 MAR 2001


WIPO

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SK/SJB/P10173PC		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/03879	International filing date (day/month/year) 19/11/1999	Priority date (day/month/year) 19/11/1998	
International Patent Classification (IPC) or national classification and IPC G11B31/00			
Applicant MEMORY CORPORATION TECHNOLOGY LTD et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>7</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 8 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none">I <input checked="" type="checkbox"/> Basis of the reportII <input type="checkbox"/> PriorityIII <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicabilityIV <input type="checkbox"/> Lack of unity of inventionV <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statementVI <input checked="" type="checkbox"/> Certain documents citedVII <input checked="" type="checkbox"/> Certain defects in the international applicationVIII <input checked="" type="checkbox"/> Certain observations on the international application			
Date of submission of the demand 16/06/2000		Date of completion of this report 09.03.2001	
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/03879

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-24 as originally filed

Claims, No.:

1-40 as received on 25/01/2001 with letter of 23/01/2001

Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

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EXAMINATION REPORT**

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☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-40
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-40
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-40
	No:	Claims	

2. Citations and explanations
see separate sheet

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Reference is made to the following documents:

D1: US-A-5 619 570
D2: EP-A-0 786 774
D3: US-A-5 724 546

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1.) The present invention relates to an audio player system comprising a portable base unit with non-volatile memory means, with data copying and transfer means, and also with a removable audio player device with solid state memory means and playback means. Further, the base unit is provided with copy controlling means for limiting the number of times that data copied onto the memory means thereof can be copied and transferred to the removable player device.
- 2.) Document D1, which is considered to represent the most relevant state of the art, discloses an audio player system comprising
 - ◆ a portable base unit (1001) which receives audio data (cf. D1, col. 7, lines 48 - 51; and col. 9, lines 25 - 28),
 - ◆ non-volatile memory means for storing said received audio data (cf. D1, 1003; col. 9, lines 8 - 11) and
 - ◆ data copying and transfer means (1004, 1005, 1006) for copying audio data stored in said memory means (1003) and transferring (via 102) said copied data to output interface means (1004) of the base unit;the system comprises also
 - ◆ a removable audio player device (cf. D1, fig.2 "Information reproduction app. with earphone"; fig. 6, 1011) comprising
 - ◆ solid state memory means (1012),
 - ◆ and playback means for enabling audio data stored to be played (via 113) to a user (cf. D1, col. 10, lines 30 - 37),
 - ◆ said player device having complementary interface means for interfacing with said base unit (cf. D1, fig. 2, "coupling terminal", and col. 7, lines 25 - 37)

whereby audio data may be transferred from the base unit to the solid state memory means of the removable player device (cf. D1, col. 7, lines 25 - 62).

Therefore the subject-matter of claim 1 differs from D1 in that

- ♦ audio extractions means for extracting digital audio data from at least one optical storage disk which may be engaged in the base unit, are used for transferring digital audio data to the portable base unit;

and that

- ♦ the base unit is provided with copy controlling means for limiting the number of times that data copied onto the memory means thereof can be copied and transferred to the removable player device.

The problem to be solved by the present invention may therefore be regarded as to avoid music piracy. Without such controlling means, music on CD could be borrowed from the owner of a CD and a permanent digital copy could be made on the memory means of the base unit. The original CD could be returned to the owner and the digital copy of the music could be kept on the memory means of the base unit and could be played without authority at any time.

This kind of music piracy can be avoided by the present invention.

None of the available prior art documents neither describes nor gives a hint to such a kind of solution providing against music piracy.

D1 describes the steps of downloading data, e.g. music, to the base unit first (cf. col. 20, lines 29 - 49) and then to enable via control section means in the base unit and based on a code received from the write management section in the removable audio player device, the transfer of data from the base unit to the removable player device (cf. D1, flowchart fig. 9).

D2 and D3 describe information collecting and providing systems, but these documents give no hint to control the number of times how often the collected information has to be copied to memory means.

Therefore, the subject-matter of claim 1 is novel and inventive (Article 33(2)(3) PCT).

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03879

- 2.) Claims 2 - 29 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 3.) The method claim 30 contains the features implicit from the functional behaviour of the corresponding apparatus features in claim 1 which was found to be novel and inventive.
Therefore, the subject-matter of claim 30 is also novel and inventive (Article 33(2)(3) PCT).
- 4.) Claims 31 - 40 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VI

Certain documents cited

Application No Patent No	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
DE 197 41 503 A	01/04/1999	22/09/1997	-
EP-A-0 957 489	17/11/1999	24/11/1998	-
EP-A-0 924 708	23/06/1999	17/04/1998	-

Re Item VII

Certain defects in the international application

- 1.) Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2 and D3 is not mentioned in the description, nor are these documents identified therein.
- 2.) The independent claims are not in the two-part form in accordance with Rule 6.3(b)

PCT, which in the present case would be appropriate.

Re Item VIII

Certain observations on the international application

The reference sign '5' in fig. 1 resp. fig. 3 is used for two different parts of the player system.

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CLAIMS

1. An audio player system comprising: a portable base unit (1) having audio data extraction means (20) for extracting digital audio data from at least one optical storage disk (6) which may be engaged in the base unit in use thereof, non-volatile memory means (22) for storing audio data extracted from said at least one optical storage disk, and data copying and transfer means (24) for copying audio data stored in said memory means and transferring said copied data to an output interface means (3) of the base unit; and a removable audio player device (2) comprising solid state memory means (10) for storing audio data thereon, and playback means (12, 21) for enabling audio data stored in said solid state memory means to be played to a user, said player device having complementary interface means (4) for interfacing with said base unit output interface means (3) whereby audio data may be transferred from the base unit (1) to the solid state memory means of the removable player device.

20

2. An audio player system according to claim 1, wherein the solid state memory means (10) of the player device is DRAM means.

25 3. An audio player system according to claim 1, wherein the solid state memory means (10) of the player device is FLASH memory means.

4. An audio player system according to any preceding claim, wherein the playback means of the player device (2) is formed and arranged for playback of audio data stored in the solid state memory means (10) both while the device (2) is not interfaced with the base unit (1) and while the device (2) is interfaced with the base unit (1).

35

5. An audio player system according to claim 4, wherein the playback means is also formed and arranged for playback of

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audio data supplied directly to the playback means from the base unit (1) while the player device (2) is interfaced with the base unit.

5 6. An audio player system according to any preceding claim, wherein the audio data extraction means (20) of the base unit is selected from a CD drive, a CD-ROM drive and a DVD-ROM drive.

10 7. An audio player system according to any preceding claim, wherein the non-volatile memory means (22) comprises at least one hard disk.

8. An audio player system according to any preceding claim,
15 wherein the copying and data transfer means comprises processor means for carrying out and controlling the copying of audio data from the memory means (22) of the base unit, and transferring the copied data to the output interface means (3).

20

9. An audio player system according to any preceding claim, wherein the base unit (1) includes data compression means (28) for compressing the digital audio data extracted from at least one optical storage disk (6) engaged in the base unit in use
25 thereof, prior to storing the compressed data in the memory means (22) of the base unit.

10. An audio player system according to claim 9, wherein the data compression means comprises an MPEG Layer III encoder.

30

11. An audio player system according to claim 9 or claim 10, wherein the player device (2) incorporates data decompression means (11) formed and arranged for decompressing the compressed data which is downloaded to the solid state memory
35 means (10) of the player device (2) from the base unit (1).

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12. An audio player system according to claim 11, wherein the decompression means comprises an MPEG Layer III decoder.

13. An audio player system according to any preceding claim,
5 wherein the playback means of the removable player device (2) includes Digital to Analogue (D/A) converter means (21) for converting stored digital data to analogue form suitable for playback to a user.

10 14. An audio player system according to any preceding claim, wherein the playback means of the player device includes processor means (12) for controlling operation of the player device (2) and playback of audio data.

15 15. An audio player system according to any preceding claim, wherein the interface means (4) of the player device is formed and arranged for receiving data downloaded thereto at at least the same rate as the rate at which data is transferred thereto by the output interface means (3) of the base unit (1).

20

16. An audio player system according to any preceding claim, wherein the player device (2) further includes selection means (18) for enabling a user to select audio data to be copied to the solid state memory means from the base unit.

25

17. An audio player system according to any preceding claim, wherein the selection means includes user interface means (18) for enabling a user to input track identification data to a non-volatile memory means (17) provided in the player device.

30

18. An audio player system according to claim 17, wherein the user interface means includes visual display means (19) for displaying information to a user.

35 19. An audio player system according to claim 17 wherein the user interface means includes a microphone (13) for enabling a user to input track identification data to the player device.

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20. An audio player system according to any of claims 17 to 19, wherein the processor means (12) of the player device is programmed to input the stored, user-entered track identification data to the base unit, when the player device is interfaced therewith, and the base unit is programmed to use the track identification data input thereto to select the track(s) to be copied to the player device from the memory means (22) of the base unit.
- 10
21. An audio player system according to claim 2, wherein the player device further includes refresh signal means (12) formed and arranged for refreshing the DRAM means after data has been downloaded thereto from the base unit so that data stored in the DRAM means is maintained therein for at least a predetermined period of time after data has been downloaded thereto.
- 15
22. An audio player system according to claim 21, wherein said data stored in the DRAM means is maintained therein for a limited period of time whereby the music copied to the player device is a temporary copy.
- 20
23. An audio player system according to any preceding claim wherein the interface means (4) of the player device comprises a standard Compact Flash slot and the output interface means (3) of the base unit comprises a complementary interface formed and arranged for inserting into said slot.
- 25
24. An audio player system according to claim 23, wherein the playback means (12, 21) is formed and arranged for enabling the player device to playback data from a standard Compact Flash card (15) which may be inserted into said slot when the player device is not being interfaced to the base unit.
- 30
25. An audio player system according to any preceding claim, wherein the base unit is provided with copy controlling means
- 35

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(24, 34) for limiting the number of times that data copied onto the memory means (22) thereof can be copied and transferred to the removable player device.

5 26. An audio player system according to claim 25, wherein the copy controlling means comprises the processor means (24) of the base unit, the processor means being programmed to prevent data from an optical storage disk from being copied to the player means more than a predetermined number of times unless
10 the optical storage disk is reinserted into the base unit, and counter means (34) for enabling said predetermined number of times to be counted.

27. An audio player system according to claim 25, wherein the
15 copy controlling means comprises the processor means (24) of the base unit, the processor means being programmed to prevent data from an optical storage disk from being copied to the player device again until a predetermined time has passed from it last being copied, and timer means provided in the base
20 unit for enabling said predetermined time to be measured.

28. An audio player system according to claim 25, wherein a playback time credit is stored in a non-volatile memory in the base unit, said playback time credit being an allowed amount
25 of playback time in the player device of audio data which has been copied to the memory means of the base unit.

29. An audio player system according to claim 28, wherein the player device is provided with a non-volatile memory (17) and
30 is configured so as to log in this non-volatile memory the amount of playback time used in the player device since a given starting time and the base unit is configured to subtract from the stored playback time credit in the base unit the playback time logged in the non-volatile memory of the
35 player device, when the player device is interfaced into the base unit.

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30. An audio player system according to claim 28 or claim 29, wherein the base unit is also configured so as to request an optical storage disk validation process to be carried out by the user when the playback time credit stored in the base unit reaches a predetermined minimum value, and to prevent further use of the base unit until the validation process has been carried out successfully.

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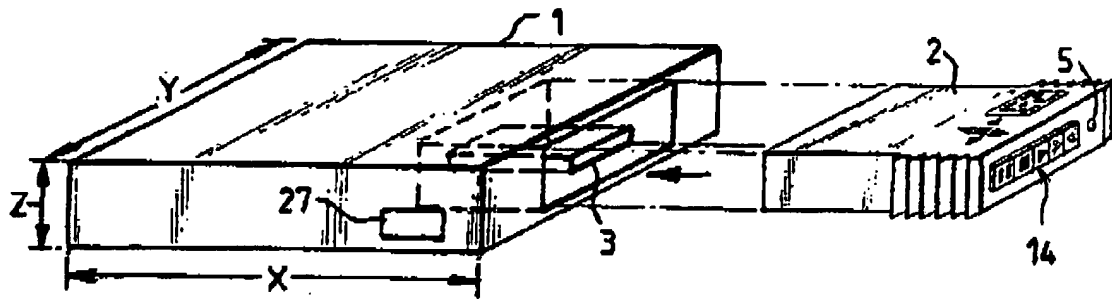


Fig. 1

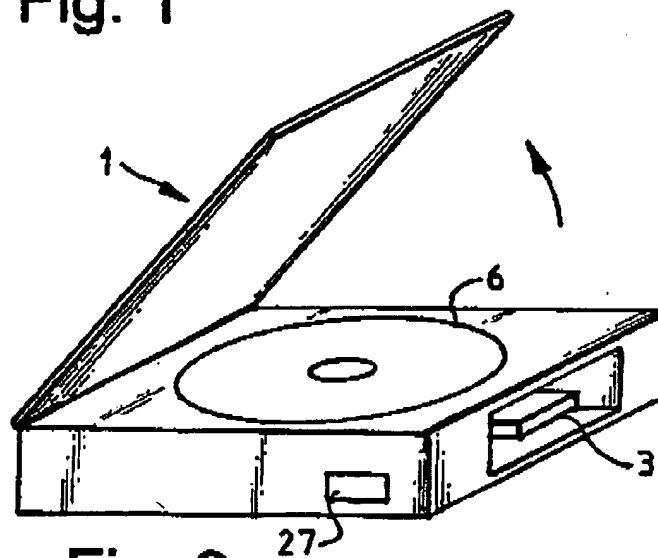


Fig. 2

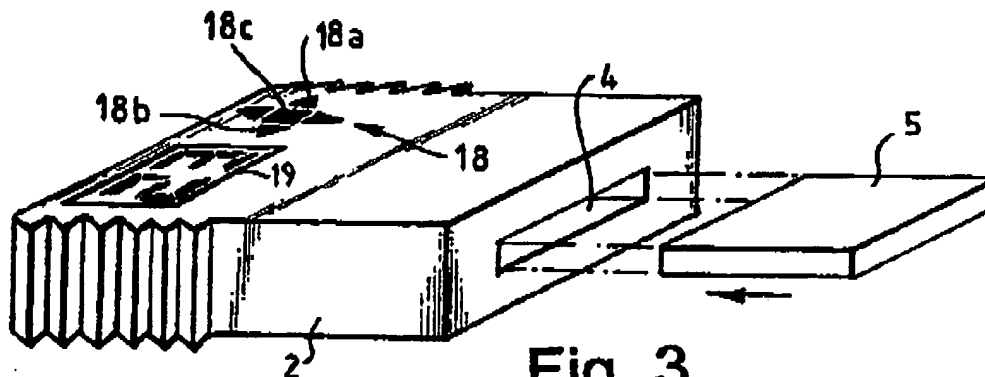


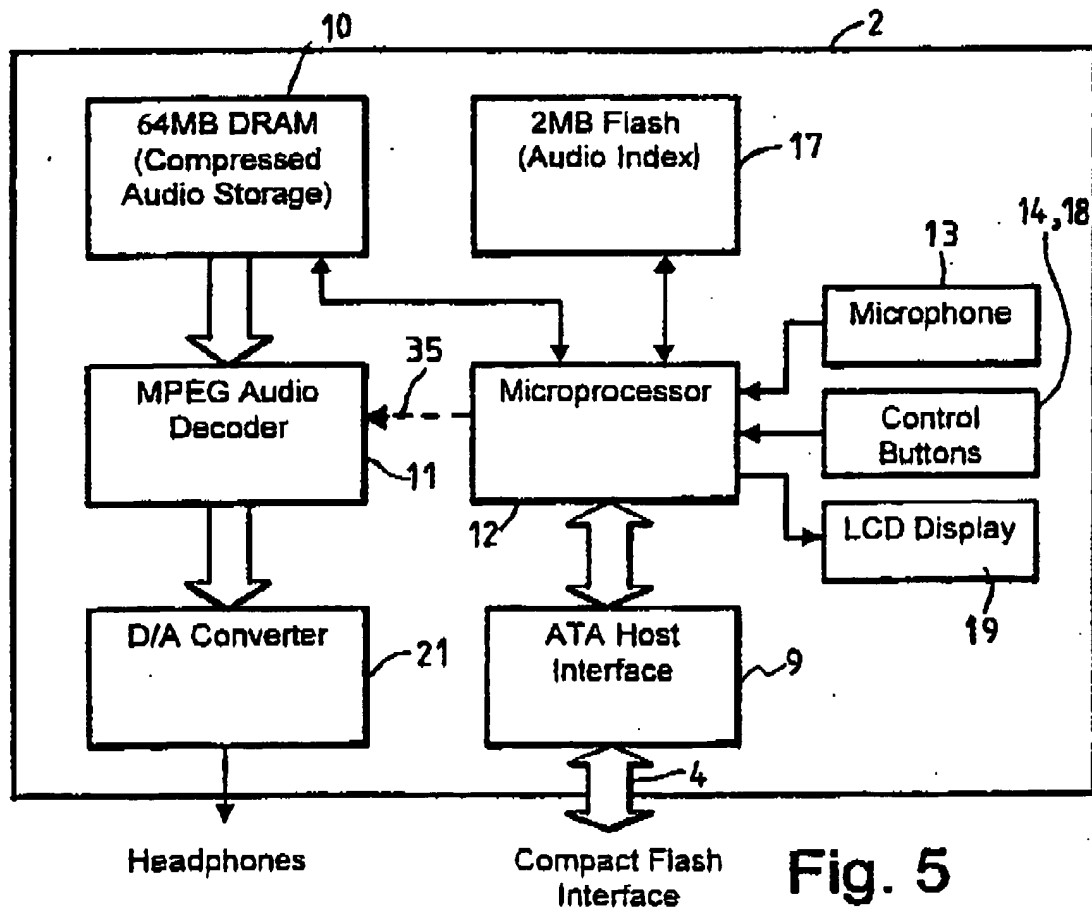
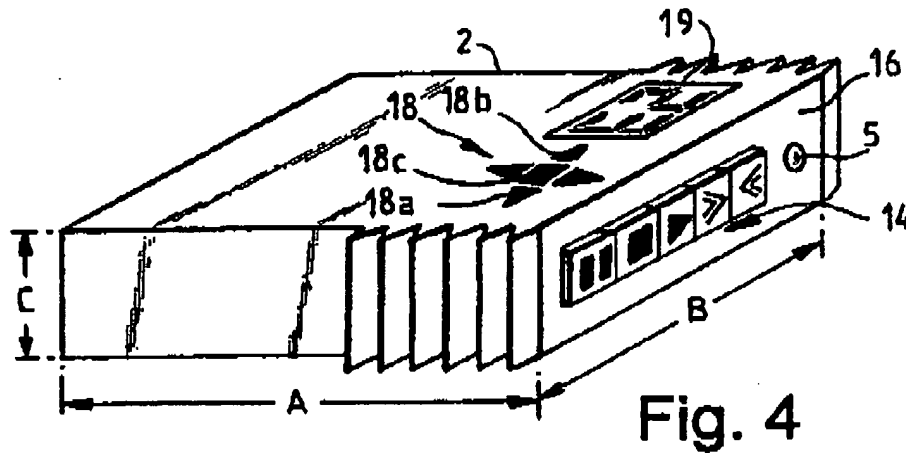
Fig. 3

SUBSTITUTE SHEET (RULE 26)

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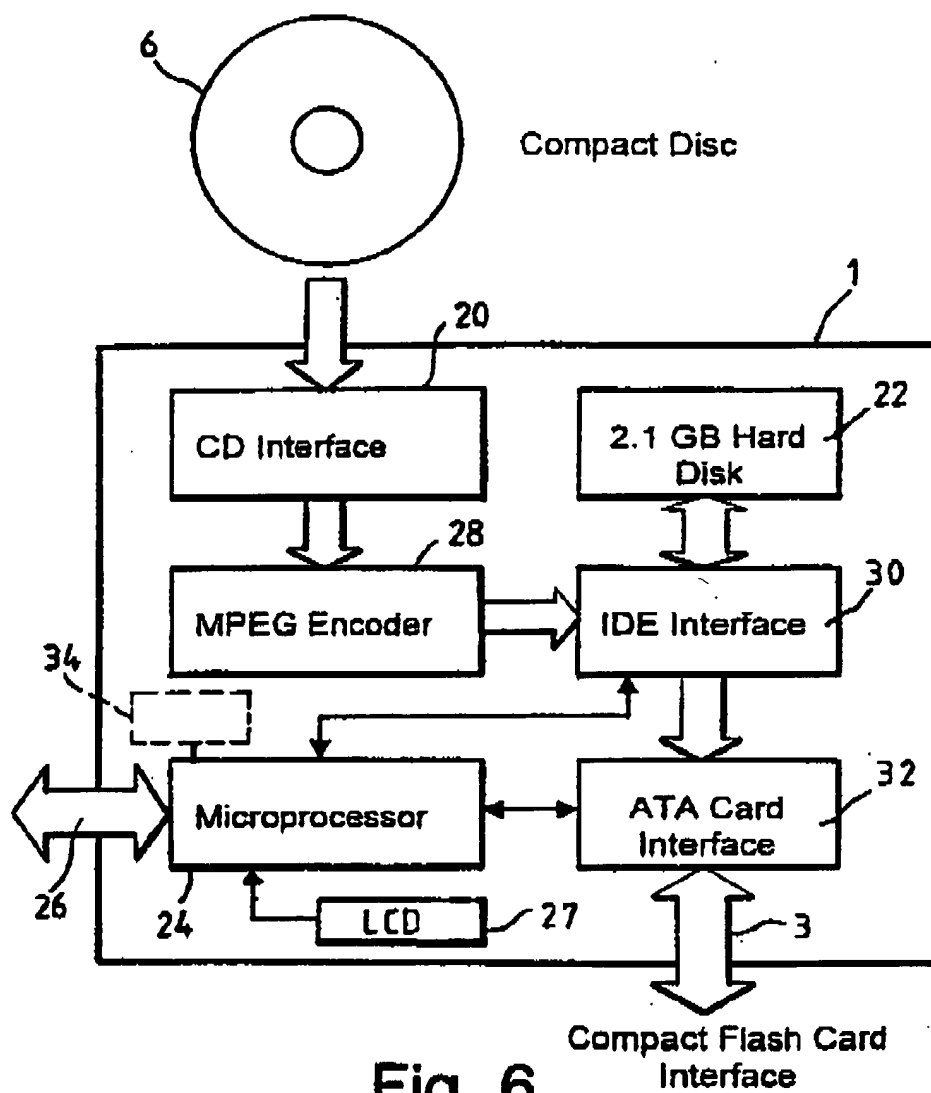
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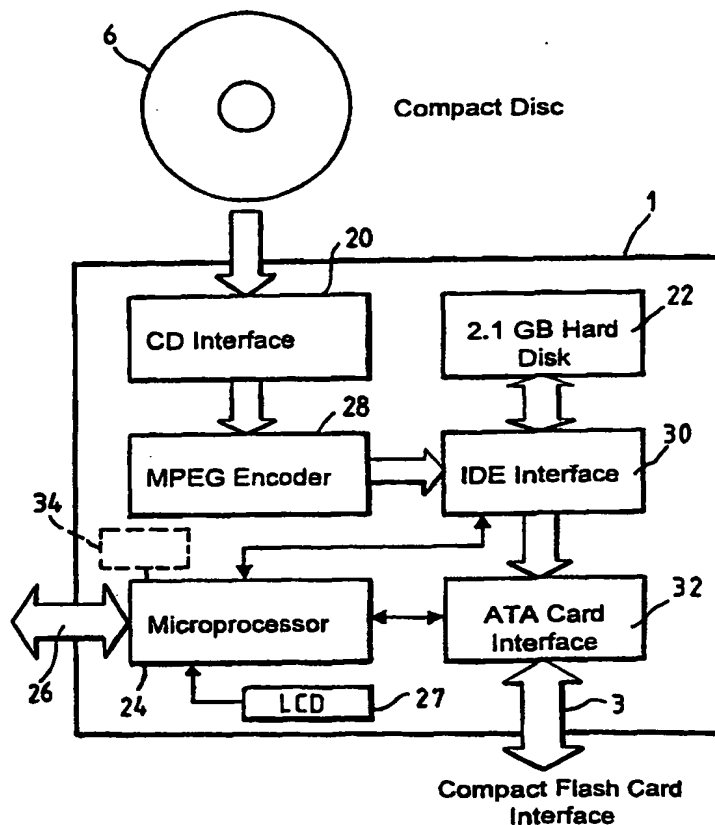
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/GB99/03879 (22) International Filing Date: 19 November 1999 (19.11.99) (30) Priority Data: 9825342.0 19 November 1998 (19.11.98) GB 9906697.9 24 March 1999 (24.03.99) GB (71) Applicant (for all designated States except US): MEMORY CORPORATION TECHNOLOGY LIMITED [GB/GB]; The Computer House, Dalkeith Palace, Dalkeith, Midlothian EH22 2NA (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): TAYLOR, Richard, Michael [GB/GB]; Old Sawmill House, 41 Newmills Road, Dalkeith, Midlothian EH22 2AQ (GB). (74) Agents: McCALLUM, William, Potter et al.; Cruikshank & Fairweather, 19 Royal Exchange Square, Glasgow G1 3AE (GB).		(81) Designated States: GB, JP, KR, SG, US. Published With international search report. With amended claims.

(54) Title: AUDIO PLAYER SYSTEM

(57) Abstract

An audio player system for enabling a user to copy digital audio material from an optical storage medium, such as a Compact Disk (CD) or Digital Video/Versatile Disk (DVD) (6), to a portable audio player device (2) having solid state memory. The system includes: a portable base unit (1) for extracting digital audio data from one or more CDs (6) engaged in the base unit, non-volatile memory (22) for storing the extracted audio data, and a processor (24) for copying audio data stored in the non-volatile memory and transferring the copied data to an output interface (3) of the base unit; and a removable audio player device (2) comprising solid state memory (10) for storing audio data thereon, and playback means (12, 21) for enabling audio data stored in the solid state memory to be played to a user. Audio data may be transferred from the base unit (1) to the solid state memory (10) of the removable player device (2).



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AUDIO PLAYER SYSTEM

The present invention relates to a new audio player system for enabling a user to copy digital audio material from an optical storage medium, such as a Compact Disk (CD) or Digital Video/Versatile Disk (DVD), to a portable audio player device having solid state memory.

According to the invention we provide an audio player system comprising: a portable base unit having audio data extraction means for extracting digital audio data from at least one optical storage disk which may be engaged in the base unit in use thereof, non-volatile memory means for storing audio data extracted from said at least one optical storage disk, and data copying and transfer means for copying audio data stored in said memory means and transferring said copied data to an output interface means of the base unit; and a removable audio player device comprising solid state memory means for storing audio data thereon, and playback means for enabling audio data stored in said solid state memory means to be played to a user, said player device having complementary interface means for interfacing with said base unit output interface means whereby audio data may be transferred from the base unit to the solid state memory means of the removable player device.

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The invention thus provides a consumer digital audio product using a combination of solid state and magnetic storage. This fusion of technologies allows the creation of a rugged, small and low power player with the capability of extremely rapid download of a large library of music.

30

The solid state memory means of the player device is preferably DRAM means. Alternatively, the solid state memory means may be FLASH memory means.

35

The playback means of the player device is preferably formed and arranged for playback of audio data stored in the solid

state memory means both while the device is not interfaced with the base unit and while the device is interfaced with the base unit. The playback means may also be formed and arranged for playback of audio data supplied directly to the playback means from the base unit while the player device is interfaced with the base unit.

The audio data extraction means of the base unit preferably comprises a CD drive, or a CD-ROM or DVD-ROM drive. The non-volatile memory means preferably comprises one or more hard disk(s). The copying and data transfer means preferably comprises processor means, for example a microprocessor, for carrying out and controlling the copying of audio data from the memory means of the base unit, and transferring the copied data to the output interface means. The output interface means is preferably formed and arranged for handling relatively high speed download of data to the removable player device and may for example, be a Compact Flash interface. The base unit preferably also includes data compression means, for example an MPEG Layer III encoder, for compressing the digital audio data read from one or more CDs engaged in the CD drive in use thereof, prior to storing the compressed data in the memory means of the base unit. Compressing the data in this manner has the advantage of enabling very fast downloading rates to be achieved for download of data from the base unit to the player device, for example much faster than real time CD playback rate.

The playback means of the removable player device preferably includes Digital to Analogue (D/A) converter means for converting stored digital data to analogue form suitable for playback to a user via, for example speakers or, more preferably, headphones, which may be attached to an analogue output of the player device. Where the base unit incorporates data compression means for compressing the data which is copied to the base unit memory means from the CD(s), the player device will incorporate data decompression means formed

and arranged for decompressing the compressed data which is downloaded to the solid state memory means of the player device from the base unit. The playback means of the player device preferably includes processor means for controlling
5 operation of the player device and playback of audio data. The interface means of the player device is preferably formed and arranged for receiving data downloaded thereto at at least the same rate as the rate at which data is transferred thereto by the output interface means of the base unit.

10

The player device preferably further includes selection means for enabling a user to select audio data to be copied to the DRAM means from the base unit. The control means may include user interface means for enabling a user to input, for
15 example, CD or CD track identification data to a non-volatile memory means provided in the player device. The user interface means may include visual display means for displaying information (such as track number) to a user, and/or audio input means, such as a microphone, for enabling a user to
20 input audio identification data to the player device. The processor means of the player device is preferably configured and/or programmed to input the stored, user-entered identification data to the base unit, when the player device is interfaced therewith, and the base unit is configured
25 and/or programmed to use the identification data input thereto to select the tracks to be copied to the player device from the memory means of the base unit.

Where the solid state memory means comprises DRAM means, the
30 player device will preferably further include refresh signal means formed and arranged for refreshing the DRAM means after data has been transferred or "downloaded" thereto from the base unit so that data stored in the DRAM means is maintained therein for at least a predetermined period of time after data
35 has been downloaded thereto. Said predetermined time may, for example, be only a few hours whereby the music copied to the player device is a temporary copy.

The interface means of the player device preferably comprises a standard Compact Flash slot and the output interface means of the base unit comprises a complementary interface formed and arranged for inserting into said slot. The playback means 5 is preferably formed and arranged for enabling the player device to playback data from a standard Compact Flash card which may be inserted into said slot when the player device is not being interfaced to the base unit.

10 The base unit may be provided with copy controlling means for limiting the number of times that data copied onto the memory means thereof can be copied and transferred to the removable player device. The copy controlling means may be provided in a processor means of the base unit which may, for example, be 15 programmed to prevent data, such as the contents of a CD copied to the memory means, from being copied to the player means more than a predetermined number of times unless the original data source (e.g. the original CD) is reinserted into the base unit. Alternatively, the processor means may be 20 programmed to prevent the same CD from being copied to the player device again until a predetermined time has passed from it last being copied (e.g. one week). In this case the base unit would include suitable timer means for enabling said predetermined time to be measured.

25

In one possible embodiment, a playback time credit may be stored in a non-volatile memory in the base unit, said playback time credit being an allowed amount of playback time (in the player device) of audio data which has been copied to 30 the memory means of the base unit. In this embodiment, the player device is preferably provided with a non-volatile memory and is configured so as to log in this non-volatile memory the amount of playback time used in the player device (since a given starting time). The base unit is preferably 35 configured to subtract from the stored playback time credit in the base unit the playback time logged in the non-volatile memory of the player unit, when the player unit is interfaced

into the base unit. The base unit is preferably also configured so as to request a CD validation process to be carried out by the user when the playback time credit stored in the base unit reaches a predetermined minimum value, and to prevent further use of the base unit until the validation process has been carried out correctly.

Preferred embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings in which:

Fig.1 shows a portable audio system according to the invention;

Fig.2 shows a base unit of the audio system of Fig.1;

Fig.3 is a rear perspective view of a removable player device of the audio system of Fig.1;

Fig.4 is a front perspective view of the player device of Fig.3;

Fig.5 is a block diagram of the various components of the player device of Figs. 3 and 4; and

Fig.6 is a block diagram of the various components of the base unit of Fig. 2.

The portable audio system of Fig.1 comprises a base unit 1 and a removable player device 2. The player unit 2 and base unit 1 plug together via complementary interfaces 3,4 to facilitate the download of music from the base unit to the player. The detached player 2 is very small and lightweight and incorporates storage means which is entirely solid state. In the described embodiment this solid state storage means is DRAM. DRAM offers several advantages which will be described, but alternatively, as described further hereinbelow, FLASH memory may be used in the player 2 instead of DRAM. The player 2 does not incorporate any magnetic tapes, optical disks, or any mechanical drives therefor. The player is powered by one or more internal (replaceable) batteries. A set of standard headphones (not shown) may be plugged into a standard jack socket 5 provided on the player 2. Alternatively, a cassette

adapter for use with a standard cassette unit in a car may be plugged into the jack socket 5. The player 2 is smaller than an audio cassette and may be easily carried in a pocket. It is especially suitable for use while exercising where its solid state nature avoids the problem of music tracks "skipping" or jumping as often occurs in conventional portable CD players due to mechanical vibrations exerted thereon.

The base unit 1 is shown in further detail in Fig.2, and Fig.6 illustrates in block diagram the various components of the unit. The base unit 1 is approximately the size of a standard portable CD player, although a little thicker. It incorporates a CD interface 20 consisting of a CD drive mechanism (comprising a CD drive and associated interfacing electronics for interfacing to other electronics in the player 2) for extracting audio data from a CD 6 which may be inserted therein, an integral hard disk unit 22 (comprising one or more hard disks) for magnetic storage of music, and a Compact Flash interface 3, of "male" type, for interconnecting with a complementary Compact Flash interface 4 of "female" type provided in the player unit 2. The base unit 1 is powered from an internal rechargeable battery (not shown). The hard disk unit 22 provides capacity for approximately 50 average length CDs. Copies of new CDs may be added to the collection on the hard disk by playing them in the CD drive mechanism integrated into the base unit. It will be appreciated that the base unit provides permanent storage for CDs that have been played in the CD player. The base unit is not able to play music directly, its function is as a copying device for allowing a user to add a new CD to their collection stored in the hard disk(s) 22 inside the unit.

The player 2 is a small portable unit that may be detached from the base unit, as shown in Fig 1. The player unit 2 is shown in further detail in Figs.2 and 3, and Fig.5 is a block diagram showing the various components thereof. Its approximate dimensions are length (A) 80mm x breadth (B) 60mm X thickness (C) 20mm. This is somewhat smaller than a

conventional magnetic tape cassette. The player 2 has 64MBytes of internal DRAM 10 that is used to store audio data downloaded from the base unit 1. Since DRAM is dynamic it needs to be constantly refreshed to maintain its content. The 5 player incorporates a microprocessor 12, powered by one or more internal batteries (not shown), which controls refreshing of the DRAM. In the described embodiment, the microprocessor issues a refresh signal (either of continuous or pulsed form) to the DRAM while the player 2 is being used (for playback).

10 When the player is not being used the DRAM does not receive this refresh signal and so data stored thereon will be lost. (Alternatively, the player unit may continue to issue the refresh signal to the DRAM for a predetermined period of time after the player has stopped being used for playback, thus 15 retaining the stored music in the DRAM for at least a preset time period.) Other embodiments are possible in which different types of DRAM refresh techniques are used. For example, the player microprocessor may be programmed to set the DRAM in a mode in which it refreshes itself (using power 20 from the player unit batteries), while the player is being used and also for at least a predetermined period of time during which the player is not being used. This enables the music stored in the DRAM to again remain in the DRAM (for later use) for a preset period of time during which the player 25 is not being used (for playback of music), but reduces the power requirement in the player (when it is not being used) and thus enables the player batteries to last longer.

The intention with the system is that music will be listened 30 to immediately after being downloaded from the permanent storage (hard disk unit 22) in the base unit 1. If the player unit 2 is left unused the refresh to the DRAM is stopped and the audio data stored thereon will (immediately, or after a minimal period of time) be lost.

35

The player unit 2 has standard personal stereo controls 14 on a front face 16 of the unit, these controls including volume,

stop, play, pause and track skip etc. Additional controls 18 are also provided on the player 2 for CD selection and music collection editing. A LCD display 19 is used to display status information such as the current track number.

5

Unwanted CDs may be deleted from the hard disk to make room for new additions. This is achieved by means of a microprocessor 12 incorporated in the player 2, to which user instructions (e.g. delete stored data) may be entered via the control buttons 18 in the player 2. The base unit microprocessor 24 is programmed to receive such user instructions from the player 2 and to effect and control deletion of material from the hard disk in response thereto.

15 The base unit 1 further included data compression means in the form of at least one MPEG encoder 28 for compressing digital audio data read from the CD 6, prior to the compressed data being stored on the hard disk(s) 22. The compression thus occurs when a new CD is committed to storage in the base unit.

20 Such data compression is used in order to maximize the duration of audio data that may be stored in the 64MB of DRAM in the removable player unit 2. The MPEG encoder 28 preferably uses MPEG-2 Layer III compression which allows an approximate 12 to 1 compression ratio of audio while maintaining near CD stereo quality. Given that a CD of average length has approximately 500MB of uncompressed data on it, the average CD should therefore be compressed down to 42MB by the encoder 28. The hard disk unit 22 contains a 2.1GB hard disk which thus provides storage capacity for the music recorded on 50 CDs.

30

The base unit of Figs.1 and 2 is slightly larger than a standard portable CD player. It has dimensions as follows: length (X) 140mm x breadth (Y) 140mm x thickness (Z) 30mm. The base unit requires only a very minimal user interface 26, in the present case just a copy button, a stop button and an eject button. A small LCD display 27 may also be provided to show the amount of time remaining before CD copying is

complete. (Instead of this LCD display, other indicator means e.g. an LED may be used to indicate when copying is complete.) When a new CD is inserted into the unit and the copy button of the user interface 26 is pressed, the content of the CD is
5 then compressed by the encoder 28, using MPEG-2 layer III encoding, and transferred, via an IDE interface 30 in the base unit, to the hard disk unit 22 for permanent storage thereon. Since this operation only needs to be performed once for each CD, it only needs to occur at a rate at or below the real time
10 playback of the CD. Once the copying is complete the CD 6 may be removed from the base unit 1. The contents of the CD may then be downloaded in less than 10 seconds to the player unit 2. The base unit is configured to receive control signals from the player unit 2 (when it is interfaced thereto) which can be
15 entered by a user, using the control buttons 14,18 on the player 2, to delete CDs or individual tracks stored on the hard disk 22 to make room on the hard disk if it fills up. The base unit includes an ATA card interface 32 for interfacing the microprocessor 24 and the Compact Flash interface 3 of the
20 base unit 1, thereby enabling the microprocessor 24 to receive control signals from the player unit 2 when it is connected to the base unit 1. The player unit 2 includes its own ATA host interface 9 operative between the player unit microprocessor 12 and the Compact Flash interface 4 of the player, for
25 enabling control signals and commands to be passed from the player unit 2 to the base station 1 and vice versa.

Use of DRAM to store music downloaded to the player 2 means that music copies held on the player are intrinsically
30 temporary. If the unit is left unused for any length of time then refresh to the DRAM is as above-described disabled in order to conserve battery power. The 64MB DRAM provides enough storage space for up to approximately 90 minutes of music, enough to hold the full contents of the longest possible CD.
35 When audio data is copied from the hard disk unit 22 of the base unit, to the DRAM 10 of the player unit 2, it is transferred in the compressed form in which it is stored in

the hard disk(s) of the base unit 1. The player 2 includes an MPEG audio decoder 11 for decompressing the data downloaded from the base unit. This decoder 11 is connected to a D/A converter 21 for converting the decompressed digital data to 5 analogue output which is sent to the output (jack socket 5) of the player unit 2.

When the player 2 is attached to the base unit, the Compact Flash interface slot 4 can be used for plugging a standard 10 compact flash card 15 thereinto to allow playback of music stored on the flash card, as illustrated in Fig.3. Such music may, for example, have been downloaded from the Internet or a set top box via which music has been purchased from a cable or satellite supplier. Alternatively, the flash card may contain 15 music which has been transferred thereto from a vending facility such as a music vending kiosk. A flash card may also be used to provide extended battery life when the unit is left unused by allowing audio data stored in the DRAM 10 to be held in non-volatile flash (by copying it to the flash card) rather 20 then kept in the DRAM. The base unit may also be configured to allow music tracks to be uploaded to the hard disk 22 thereof from the player 2. This function would be advantageous where music can purchased directly on a compact flash card, or downloaded to a FLASH card via a music vending machine or set- 25 top box, since this would enable the purchased music to be stored in the hard disk 22 of the base unit, if desired.

The playback of audio data stored on the hard disk unit 22, using the player unit 2, will now be described in detail. The 30 selection of a new CD to be listened to is made on the player 2 using an audio indexing system (described in further detail below). The player device includes non-volatile memory 17, in the present embodiment this is 2Mbytes of FLASH memory, for storing audio index information. Once selection is complete 35 the player 2 may be connected to the base unit 1 and the requested CD, or requested tracks, is/are automatically transferred in less than 10 seconds. The player 2 may then be

detached and is ready for playback. The player controls 14,18 include user controls for track skipping, rewind and fast forward.

5 In comparison to a standard personal CD player, the player unit 2 of the present system is advantageous in that its operation is quicker and less cumbersome than a standard CD player in which the selection of a new CD from a storage wallet, and its exchange for the CD in the player, is
10 required. The space occupied by the player and base unit is much less than the requirements for carrying a portable CD player and the assortment of CDs required by current portable CD players. This is especially convenient if the player is to be used on a long journey where less space is used and the CDs
15 themselves do not need to be carried. A collection of 50 CDs would normally require several quite bulky carrying wallets. Given that a collection of 50 CDs is more valuable than the player this also helps reduce risks of loss of damage.

20 The player may also be operated while still inserted into the base unit (i.e. not just when it is detached therefrom). This configuration is particularly useful for in-car use where the small size of the overall system is less crucial than the ability to change CD without having to juggle with individual
25 CDs. In this mode the system can act as a jukebox, allowing continuous random play across tracks from the whole collection stored on the hard disk unit 22 of the base unit 1. Tracks to be played back will preferably first be downloaded to the DRAM
30 unit to be switched off, to conserve power, after the desired tracks have been downloaded to the player 2. Alternatively, though, tracks may be accessed directly from the hard disk unit 22 by the player 2 and played back directly. In this case, the tracks are delivered directly from the base unit 1
35 to the decoder 11 of the player, via the player microprocessor 12, as indicated by broken line 35 in Fig.5. The whole unit may be removed from the car when it is unattended. The fact

that the whole unit can easily be removed from the car and carried is also a useful anti-theft feature.

The CD selection and music editing controls 18 provided on the 5 player unit 2 include controls to allow the user to make selections for downloads from the base unit 1, controls to add audio indexes to CDs available from the base unit, and storage management controls to delete individual tracks or CDs from the base unit as will be described.

10 (i) Download Selection

As well as providing the normal playback functions, the player must also provide a mechanism to allow the user to select which CD (or music tracks) they wish to listen to next. Once the selection has been made the player unit 2 may be plugged 15 into the base unit 1 and data transfer is initiated automatically. This operation is the equivalent of selecting a new CD to listen to in a standard portable CD or MiniDisc player. However, the whole operation is much quicker as there is no requirement to remove the old CD, replace it in a 20 protective cover of some description, leaf through other CDs to make a new selection and then put it into the player. In effect, the base unit becomes the equivalent of the CD wallet holding a collection of CDs.

(ii) Audio Index

25 To avoid the requirement for complex controls to select a new CD a simple audio indexing system is used. Each CD will have a short audio index of a couple of seconds associated with it. This is stored in the non-volatile memory 17 in the player 2 so that it is available even after the refresh has been 30 stopped to the DRAM 10. Only a small amount of non-volatile memory 17 is required as the maximum storage requirement is a couple of minutes of audio (for up to 50 CDs) and a lower sampling rate can be used as the audio quality is of less importance. The audio index entries can come from a number of 35 potential sources, for example the audio index can be recorded from the CD itself. For instance, a chorus line from a track could be used to identify the CD. A capture mode selectable on

the player allows a button to be pressed when the CD is playing to capture the last couple of seconds of playback and make that the index associated with the CD.

5 The player contains a small microphone 13 that allows the user to alternatively record his or her own audio index for a new CD. For instance, the name of the CD can be spoken by the user and recorded as the audio index. (If a new CD is obtained via a compact flash card then the audio indexes may be provided in
10 the FLASH card, included in the card at manufacture thereof.)

The player controls 18 for CD selection include index access controls to allow the user to select the CD to be downloaded. These are in the form of back and forward buttons 18a, 18b to
15 traverse the audio indexes (by listening to them being played back) for the available CDs. When the correct entry is found a selection button 18c can be pressed. To speed up the selection process, the index playback will skip over multiple entries at once if the selection direction buttons 18a, 18b are held down.
20 The user may organise the audio index in any way they choose but for easy selection an alphabetical order could be used.

Random Play

The player features a random play function in similar fashion
25 to known portable CD players. However, as well as allowing random play of tracks available on the player it will also allow random selection of new tracks from the hard disk in the base unit 1 when the player is connected thereto for data download. In this mode a new selection of tracks to fill the
30 capacity of DRAM 10 in the player is extracted each time it is plugged into the base unit. Information would be stored in the non-volatile memory 17 of the player (by the microprocessor 11 of the player) identifying which tracks have been recently selected so that they would not be selected again the next time
35 music is downloaded to the player 2. In this mode, with the player permanently attached to the base unit, continuous random play across all CDs is possible without any interaction

from the user. This would also allow the system to be used in the home as a digital jukebox (with the output going to a Hi-fi amplifier) or in a car (with the output going to a standard car stereo unit via a cassette adapter).

5

Most of the controls for the product are available on the player unit where the user may easily access them. A LCD display is used to give the current state of selections or the current track position or time when the device is actively
10 playing music. It may also give other status information such as whether random play mode is selected or not.

Storage Management

The player controls 18 include controls to manage the storage
15 space (hard disk 22) in the base unit 1. One obvious function that is required is a CD delete option. This allows an entire CD to be deleted from the hard disk 22 to make room for new CDs to be added. If a new CD is put in the base unit and there is insufficient space to store it there in compressed form,
20 the microprocessor 24 of the base unit is programmed to issue an error message which is displayed on an LCD (not shown) on the base unit 1. The user must then use the player unit 2 to select a CD to be deleted. The microprocessor 11 of the player 2 is programmed to enable these delete commands to be input to
25 the player 2 by the user (via the user control buttons 18) while the player is separated from the base unit. These commands will then take affect the next time the player 2 is plugged into the base unit 1.

30 Copy Management

Without any copy management the above-described audio system could be easily used for music piracy. Music on CD could be borrowed from the owner and a permanent digital copy made on the hard disk in the base unit. The original CD could be
35 returned to the owner and the digital copy kept and played at any time. Copy management is therefore critical and is likely to be required by the music industry. Copy management

mechanisms increase the difficulty of making permanent illegal copies of music.

Since the player unit 2 has no digital output facility there is no potential for making second generation copies of music using the device. Data passed from the base unit 1 to the player can also be encrypted so that direct eavesdropping of the communication cannot easily allow access to the music data. Our system is additionally provided with copy management features which are targeted at ensuring that the first generation copy onto the hard disk storage 22 of the base unit is acceptable to the music industry.

A number of different approaches can be taken to implement copy management on the device, depending upon the original source of the music. Where the music is source from standard CDs, one problem with copies made from CDs, using the base unit 1, is that there is no way of determining if the user is the actual owner of the CD. If not, then the copy made on the hard disk is certainly illegal and would be unacceptable to the music industry. Since it is not possible to determine ownership of the CD the next best thing is to determine that the user has consistent access to the CD. If the user cannot prove that the CD is still in his or her possession then the assumption is that the copy was illegal and the copy on the hard disk is made unavailable for download to the player unit 2. In effect this mechanism makes the copy on the hard disk temporary rather than permanent. However, when the user has to present the CD to enable the copy management mechanism there is no need to completely re-copy and compress the data from the CD onto the hard disk again. If the CD can be recognised as the original then the existing data on the hard disk is reused. In effect, the presentation of the CD enables use of the copy. A simple unique attribute of the CD can be used to prove its identity. Either an existing electronic serial number on the CD or the Table of Contents (TOC) can be used to identify the CD. It is highly unlikely that two CDs would have

exactly the same number of tracks of the same length. A read of the CD TOC and re-enable of the data on the hard disk would only take a few seconds.

5 We propose two different techniques which may be used to limit the use of a hard disk copy before the original has to be presented. Our system is configured to implement either one or the other of these two techniques which are referred to hereinbelow as the "Play Limited" and the "Time Limited"

10 techniques.

Play Limited

In this embodiment of the invention, the number of times that a copy of a CD (stored in the hard disk unit 22) can be played

15 is limited. Once the play limit has been reached the original CD has to be put into the base unit 1 to re-enable the hard disk copy. Until this is done this CD is temporarily flagged (by the base unit microprocessor 24) as not accessible for download to the player 2, and the stored audio index for this

20 CD is made unavailable for selection. It will be appreciated that to implement this embodiment, the base unit 1 will include a counter 34, linked to the microprocessor 24, for counting the number of downloads of any one CD stored in the hard disk unit 22 and activating the microprocessor, when the

25 predetermined maximum count has been reached, to prevent further downloads until the original CD is reinserted in the base unit and a unique identification code thereon is recognised (by the microprocessor 24).

30 In the extreme, for example, the play limit could be set at one. Thus the CD would have to be presented every time the CD copy is downloaded to the player. This wouldn't add much to the download time of 10 seconds since the CD can be validated in a few seconds. This would increase the user effort involved

35 in downloading a new CD and would mean that the CD has to be carried along with the base unit in order to listen to it multiple times. Even with this quite severe restriction the

unit would, though, still be useable. For instance, a user could quickly put their CDs through the unit before departing on a journey or holiday and leave the original CDs at home. Each of the 50 CDs on the hard disk collection could then be 5 listened to once. This represents a play back time of over 48 hours. If there are particular favourite CDs that the owner wants to listen to several times then just those CDs need to be carried. If the music industry was agreeable then a higher play back limit could be used. The point is that this 10 mechanism prevents permanent copies of music being made without access to the original CD.

Time Limited

In this alternative embodiment time limiting is used to 15 restrict CD copying. In this embodiment, a CD can be downloaded any number of times but there is a time limit from the last time the CD was presented for download to the player 2 (from the hard disk unit 22), after which further downloads are not possible. For instance, it is possible that the time 20 out limit could be set at one week. Once the CD is copied to the hard disk unit 22 for the first time, or re-presented to enable copying again, the timer is initiated. Access to the copied CD (for download) is allowed until a period of one week has passed, after which the CD has to be presented again to 25 the base unit 1 to allow further downloads to the player 2. This mechanism directly enforces a temporary nature to the copies on the hard disk. In order to implement this embodiment it will be appreciated that the base unit will include timer means 34, for example in the form of known clock/counter 30 arrangements, for timing the set period in which access is allowed to the copied CD and for activating the microprocessor 24 to prevent further downloads being allowed until the original CD is reinserted into the base unit 1. Upon detecting the presence of the reinserted CD (by recognising a unique 35 identifying code thereon e.g. ISRC number) the microprocessor again allows downloads of the stored CD to the player until

the set period of time (measured by the clock/counter) has again expired, and the process needs to be repeated again.

It will be appreciated that the primary motivation for the use of a combination of DRAM in the player 2 and magnetic storage in the base unit 1 is that of cost. Current DRAM prices are of the order of \$1 per MB whereas cost for magnetic storage on a 2.5" hard drive is of the order of \$0.05 per MB. This huge pricing differential makes the concept of using a hard drive for permanent storage of music and DRAM for temporary storage very attractive. Given that the solid state player can be detached from the base unit the advantages of solid state in terms of size and robustness for the player are achieved with the above-described audio system. Due to the nature of the product, the player storage is intrinsically temporary, which is attractive in that the system therefore does not lend itself to the purpose of making permanent unauthorised copies of music e.g. pirate copies.

DRAM is also more attractive than Flash memory for the temporary audio storage in the player unit 2 since the DRAM provides a much higher write bandwidth. To allow the download of a complete CD in less than 10 seconds a data transfer rate of 5MB/s needs to be sustained between the base unit and player. This is relatively easy to achieve using DRAM technology but would require fully interleaved access to multiple NAND/AND flash devices which is beyond the current sustained write performance of existing compact flash cards.

Nevertheless FLASH memory could be used in the player 2 as an alternative to DRAM while still providing some of the advantages of the above-described system. In particular the advantages of solid state in terms of size and robustness for the player are still achieved. Additionally, although the music copied to the player is of a more permanent nature than music copied to DRAM which must be continually refreshed in order to retain its content), the copy management features

provided in the base unit and player (i.e. Time Limited and/or Play Limited versions as above-described) are still an effective measure in controlling to control the use of the base station for mass copying of CDs.

5

It will be appreciated that various other modifications to the above-described embodiment(s) are possible without departing from the scope of the invention. For example, other variants of random play mode are also possible. A facility, which could
10 be conveniently implemented by appropriate programming of the microprocessor of the player and/or the base unit, could be included to link CDs by the same artist. This would be done when a new CD is added to the collection, by selecting an existing CD by the same artist using a special selection mode.
15 A random play mode could then be selected that only played tracks by the same artist but across multiple CDs. A further variant would allow CDs (stored in the hard disk unit 22) to be assigned to particular mood categories when they are added to the collection. Random play could then be restricted to CDs
20 assigned to the same mood. This would also allow different users with differing musical tastes to share the same product and to partition their music separately from other users.

Further delete options may be provided in the player 2 and/or
25 unit 1 for allowing a user to delete individual tracks stored on the hard disk unit 22 if the he/she doesn't like them. the system may also be configured so that the user can choose that certain tracks are combined so that they are always heard back to back, even if the random play function is selected.

30

The base unit may of course be of different shape and dimensions to the above-described embodiment. It will be appreciated though that the base unit shape and dimensions will always be such that the unit is of portable, easily
35 transportable form. The base unit may further be formed and arranged for receiving more than one CD at any one time and for extracting audio data from each CD, as requested by a

user. The base unit may further be provided with user interface means/control buttons for enabling a user to instruct the base unit directly to delete data from the hard disk unit 22. This may be in addition to, or instead of, 5 delete controls provided on the player 2.

Other sizes of DRAM in the player are of course possible, not just 64MBytes. The size of DRAM chosen will generally depend on the compression rate used in the base unit, and the desired 10 maximum storage capability of the player 2.

Other indexing systems may be used other than the above-described audio indexing. For example, the player 2 may be provided with index input means, for example a small keypad, 15 for entering index numbers manually. Further possibilities would include the base unit being configured to read off indexes (audio indexes, or other indexes) from a dedicated CD which contains unique indexes for various CDs or CD tracks, or even to obtain indexes for CDs or CD tracks from another 20 available source, for example by downloading index data from an available Internet web site.

The player 2 may further include data copying and transfer means formed and arranged for copying data from the player 25 device and transferring it to the base unit 1, via the player's interface 4. In this case, since it would then be possible for a user to copy original music purchased on FLASH memory (e.g. from a vending kiosk, or via downloading from the Internet) to the hard disk unit 22 of the base station and, 30 from there, on to one or more other similar players 2, the base unit 1 and/or player 2 may be provided with further copy management means in the form of recognition means for recognising authorised and unauthorised copies of music which a user attempts to upload from the player 2 to the base unit 1 35 and to prevent unauthorised copies from being uploaded. This may be achieved by, for example, programming the base unit to recognise a unique identification code associated with an

authorised copy of music, for example an identification code stored in a FLASH memory card (by the manufacturer/distributor) identifying the music stored on the card as an authorised (e.g. purchased) copy, and/or a unique
5 code which is transferred to the player together with music downloaded thereto from the said base unit. Thus, if a user tries to upload music to a first base unit which has been copied to the player using a second base unit, the first base unit will recognise that this is an unauthorised copy and will
10 prevent it from being uploaded to the first base unit.

It would be possible for both the above-described Time Limited, and Play Limited copy management techniques to be provided in the same audio system, if desired.

15

Modified Play Limited Embodiment

A modified version of the above-described Play Limited copy management techniques will now be described. As above-described, in the Play Limited system the original CD has to
20 be presented after a certain number of plays in order to enable further use of the copy stored in the base unit 1. One disadvantage of this system is that if the number of plays before validation is quite low then it may represent an inconvenience for the user. If the user wishes to play the
25 same CD many times then the original CD has to be carried in order to re-validate it as required. The modified system now described uses a more statistical approach for validation of CDs. In effect it samples the user's CD collection to determine whether the user has possession of the original CDs.
30 If the user does not have the CD then that is an indication that it may be illegally copied. In this approach the failure to present a particular CD not only prevents the copy of that CD being subsequently used but may also invalidate other CDs on the basis that the collection contains illegal copies.
35 Conversely, a correctly presented CD not only allows the user to continue using the copy of that CD but also allows continued use of other CDs on the basis that the sampling

indicates that the collection is composed of legal copies.

The scheme is based on a fixed playback time credit store in non-volatile memory in the base unit 1. This is the amount of 5 time that copies of CDs may be played before the base unit will request a validation. The player unit 2 logs the total amount of playing time in a non-volatile memory in the player so if a particular album is downloaded and played several times then that is logged. A commensurate reduction from the 10 playback time credit is made each time the player unit 2 is plugged into the base unit 1. Note that the time does not include use of music recorded via a PC interface and not directly obtained from the CD drive (in the CD interface 20) of the base unit 1. When the playback time credit reaches 0 15 the user is asked to perform a CD validation. The unit will not allow any playback of material copied from any CD until the validation is successfully completed. The initial amount of playback time may be determined by the music industry, but a time of approximately 100 hours is conjectured. Thus the 20 unit can be used without restriction for 100 hours. For instance, this allows the user to make use of the portable audio system (i.e. base unit 1 and player 2) for a long holiday or journey without the requirement to take any physical CDs.

25

Successfully presenting a CD for validation is termed a recharge operation. The base unit 1 remembers all the CDs that have been played, and the time that they have been played for, since the last recharge operation. If a compilation from many 30 CDs is played then each of the source CDs is deemed to have been played for the duration of the tracks used from that CD. The user may request a recharge operation at any time using a menu option provided therefor on the base unit 1. If successful, this recharges the playback time credit to the 35 maximum value. The user might, for example, wish to do this just before taking the audio system on a holiday or journey. When there is an explicit recharge or the credit reaches 0 the

base unit 1 will ask for a CD to be presented on the CD drive of the base unit. The CD selected will be a random selection from the set of CDs played since the last recharge operation. The random function may be biased so that CDs that have been
5 played more frequently are more likely to be selected. The base unit will ask for a particular CD by displaying the name, or another distinguishing code or label, of the CD on a display provided on the base unit and the user should then present the original CD on the CD drive. The base unit 1 will
10 read the CD to validate that it is the correct one. This may be done by any suitable technique for uniquely identifying the CD, for example by reading a distinguishing code or number from the CD. For instance, the base unit 1 might use the ISRC, or a hashing function of the CD TOC, to uniquely identify the
15 CD. If the correct CD is presented then the playback credit time is reset to the maximum value. If the user cannot find the CD then there is an option to try again. The CD that could not be presented will be disabled from further use. Another CD from the set of those played since the last recharge will be
20 chosen and the operation is repeated. The number of validation attempts allowed is likely to be determined by the music industry, but a value of 3 is conjectured. If all attempts fail then all CD copies on the base unit 1 are disabled and the playback time credit is set to the maximum value. Thus to
25 subsequently use any copies on the base unit 1 the original CD must be presented. This effectively removes all illegal copies from the base unit for which original CDs are not available.

The user may validate a CD at any time using an option on the
30 base unit menu. The process is as follows. The CD is placed on the CD drive. If the CD is recognized and its use had been disabled then further use of the disk is enabled, assuming that enough playback time credit is available. An explicit CD validation request has no effect on the playback time credit.

35

A further extension to the above-described scheme is proposed which makes it even more difficult to use illegal copies of

CDs. One disadvantage of the scheme previously described is that it is still possible to use illegal copies as long as the number used between recharge operations is limited to less than the allowed number of validation retries. In this way the user will always be able to present a CD that they possess to enable the recharge even though the illegally copied CDs will be disabled and will no longer be available. The following extended scheme makes use of the device in this manner less easy. A variable recharged playback credit time is used. This is the value that the playback credit time is set to upon completion of a successful recharge operation. Initially this will be a value like 100 hours. If the first CD requested for validation cannot be presented then the recharge value will be reduced, perhaps halved. If the second choice cannot be presented either then it will be reduced again. Thus a user who cannot consistently present CDs when asked will be granted less playback credit. If the first CD requested is presented correctly on a number of successive occasions then the recharge playback time will be set back to its initial value.

CLAIMS

1. An audio player system comprising: a portable base unit (1) having audio data extraction means (20) for extracting digital 5 audio data from at least one optical storage disk (6) which may be engaged in the base unit in use thereof, non-volatile memory means (22) for storing audio data extracted from said at least one optical storage disk, and data copying and transfer means (24) for copying audio data stored in said 10 memory means and transferring said copied data to an output interface means (3) of the base unit; and a removable audio player device (2) comprising solid state memory means (10) for storing audio data thereon, and playback means (12, 21) for enabling audio data stored in said solid state memory means to 15 be played to a user, said player device having complementary interface means (4) for interfacing with said base unit output interface means (3) whereby audio data may be transferred from the base unit (1) to the solid state memory means of the removable player device.

20

2. An audio player system according to claim 1, wherein the solid state memory means (10) of the player device is DRAM means.

25 3. An audio player system according to claim 1, wherein the solid state memory means (10) of the player device is FLASH memory means.

4. An audio player system according to any preceding claim, 30 wherein the playback means of the player device (2) is formed and arranged for playback of audio data stored in the solid state memory means (10) both while the device (2) is not interfaced with the base unit (1) and while the device (2) is interfaced with the base unit (1).

35

5. An audio player system according to claim 4, wherein the playback means is also formed and arranged for playback of

audio data supplied directly to the playback means from the base unit (1) while the player device (2) is interfaced with the base unit.

5 6. An audio player system according to any preceding claim, wherein the audio data extraction means (20) of the base unit is selected from a CD drive, a CD-ROM drive and a DVD-ROM drive.

10 7. An audio player system according to any preceding claim, wherein the non-volatile memory means (22) comprises at least one hard disk.

8. An audio player system according to any preceding claim,
15 wherein the copying and data transfer means comprises processor means for carrying out and controlling the copying of audio data from the memory means (22) of the base unit, and transferring the copied data to the output interface means (3).

20

9. An audio player system according to any preceding claim, wherein the base unit (1) includes data compression means (28) for compressing the digital audio data extracted from at least one optical storage disk (6) engaged in the base unit in use
25 thereof, prior to storing the compressed data in the memory means (22) of the base unit.

10. An audio player system according to claim 9, wherein the data compression means comprises an MPEG Layer III encoder.

30

11. An audio player system according to claim 9 or claim 10, wherein the player device (2) incorporates data decompression means (11) formed and arranged for decompressing the compressed data which is downloaded to the solid state memory
35 means (10) of the player device (2) from the base unit (1).

12. An audio player system according to claim 11, wherein the decompression means comprises an MPEG Layer III decoder.

13. An audio player system according to any preceding claim,
5 wherein the playback means of the removable player device (2) includes Digital to Analogue (D/A) converter means (21) for converting stored digital data to analogue form suitable for playback to a user.

10 14. An audio player system according to any preceding claim, wherein the playback means of the player device includes processor means (12) for controlling operation of the player device (2) and playback of audio data.

15 15. An audio player system according to any preceding claim, wherein the interface means (4) of the player device is formed and arranged for receiving data downloaded thereto at at least the same rate as the rate at which data is transferred thereto by the output interface means (3) of the base unit (1).

20

16. An audio player system according to any preceding claim, wherein the player device (2) further includes selection means (18) for enabling a user to select audio data to be copied to the solid state memory means from the base unit.

25

17. An audio player system according to any preceding claim, wherein the selection means includes user interface means (18) for enabling a user to input track identification data to a non-volatile memory means (17) provided in the player device.

30

18. An audio player system according to claim 17, wherein the user interface means includes visual display means (19) for displaying information to a user.

35 19. An audio player system according to claim 17 wherein the user interface means includes a microphone (13) for enabling a user to input track identification data to the player device.

20. An audio player system according to any of claims 17 to 19, wherein the processor means (12) of the player device is programmed to input the stored, user-entered track

5 identification data to the base unit, when the player device is interfaced therewith, and the base unit is programmed to use the track identification data input thereto to select the track(s) to be copied to the player device from the memory means (22) of the base unit.

10

21. An audio player system according to claim 2, wherein the player device further includes refresh signal means (12) formed and arranged for refreshing the DRAM means after data has been downloaded thereto from the base unit so that data
15 stored in the DRAM means is maintained therein for at least a predetermined period of time after data has been downloaded thereto.

22. An audio player system according to claim 21, wherein said
20 data stored in the DRAM means is maintained therein for a limited period of time whereby the music copied to the player device is a temporary copy.

23. An audio player system according to any preceding claim
25 wherein the interface means (4) of the player device comprises a standard Compact Flash slot and the output interface means (3) of the base unit comprises a complementary interface formed and arranged for inserting into said slot.

30 24. An audio player system according to claim 23, wherein the playback means (12, 21) is formed and arranged for enabling the player device to playback data from a standard Compact Flash card (15) which may be inserted into said slot when the player device is not being interfaced to the base unit.

35

25. An audio player system according to any preceding claim, wherein the base unit is provided with copy controlling means

(24, 34) for limiting the number of times that data copied onto the memory means (22) thereof can be copied and transferred to the removable player device.

5 26. An audio player system according to claim 25, wherein the copy controlling means comprises the processor means (24) of the base unit, the processor means being programmed to prevent data from an optical storage disk from being copied to the player means more than a predetermined number of times unless
10 the optical storage disk is reinserted into the base unit, and counter means (34) for enabling said predetermined number of times to be counted.

27. An audio player system according to claim 25, wherein the
15 copy controlling means comprises the processor means (24) of the base unit, the processor means being programmed to prevent data from an optical storage disk from being copied to the player device again until a predetermined time has passed from it last being copied, and timer means provided in the base
20 unit for enabling said predetermined time to be measured.

28. An audio player system according to claim 25, wherein a playback time credit is stored in a non-volatile memory in the base unit, said playback time credit being an allowed amount
25 of playback time in the player device of audio data which has been copied to the memory means of the base unit.

29. An audio player system according to claim 28, wherein the player device is provided with a non-volatile memory (17) and
30 is configured so as to log in this non-volatile memory the amount of playback time used in the player device since a given starting time and the base unit is configured to subtract from the stored playback time credit in the base unit the playback time logged in the non-volatile memory of the
35 player device, when the player device is interfaced into the base unit.

30. An audio player system according to claim 28 or claim 29, wherein the base unit is also configured so as to request an optical storage disk validation process to be carried out by the user when the playback time credit stored in the base unit 5 reaches a predetermined minimum value, and to prevent further use of the base unit until the validation process has been carried out successfully.

AMENDED CLAIMS

[received by the International Bureau on 14 March 2000 (14.03.00);
new claims 31-43 added; remaining claims unchanged (3 pages)]

30. An audio player system according to claim 28 or claim 29,
wherein the base unit is also configured so as to request an
optical storage disk validation process to be carried out by
the user when the playback time credit stored in the base unit
5 reaches a predetermined minimum value, and to prevent further
use of the base unit until the validation process has been
carried out successfully.

31. A method of controlling copying of audio data from a
10 library of audio data to a playback means, by copying means,
the method comprising controlling the number of times
requested audio data can be copied from the library to the
playback means by requiring an optical storage disk already
having a copy of said requested audio data recorded thereon to
15 be physically presented to said copying means.

32. A method of controlling copying of audio data from a
library of audio data to an audio player, by a copying system,
the method comprising controlling the number of times
20 requested audio data can be copied from the library to the
player by requiring an optical storage disk already having a
copy of said requested audio data recorded thereon to be
physically presented to said copying system.

25 33. A method according to claim 32, wherein the method
comprises preventing requested audio data from being copied
from the library to the player more than a predetermined
number of times unless an optical storage disk already having
a copy of said requested audio data recorded thereon is
30 physically presented to said copying system.

34. A method according to claim 33, wherein said predetermined
number of times is zero.

35 35. A method according to claim 34, wherein an optical storage
disk having a copy of said requested audio data recorded
thereon is required to be physically presented to said copying

system every time said requested audio data is to be copied from the library to the player.

36. A method according to claim 33 or claim 34, wherein an optical storage disk having a copy of said requested audio data recorded thereon is required to be physically presented to said copying system after every N times said requested audio data has been copied from the library to the player, where N is a predetermined number greater than zero, in order to allow said requested audio data to be copied from the library to the player a further N times.

37. A method according to any preceding claim, wherein the library of data is stored on at least one hard disk to which said copying system has access.

38. A method according to claim 37, wherein said copying system copies said user-requested audio data direct to said player for immediate playback.

39. A method according to claim 37, wherein said copying system copies said user-requested audio data to a memory of said player.

40. A method according to any of claims 32 to 39, wherein said library of audio data comprises compressed copies of audio data copied from a multiplicity of original optical storage disks having the audio data recorded thereon.

41. A method according to any of claims 32 to 40, wherein upon physical presentation of said optical storage disk to said copying system validation data is read from said optical storage disk by said copying system and, if the read validation data is recognised by the copying system, then the copying system allows the requested audio data to be copied to the player, but if the read validation data is not recognised by the copying system, then the copying system prevents the

requested audio data being copied to the player.

42. A method according to any of claims 32 to 41, wherein an optical storage disk having a copy of said requested audio data recorded thereon is required to be physically presented to said copying system after a predetermined period of time has passed since the requested audio data was last copied from the library to the player, in order to allow further copying of the requested audio data to the player.

10

43. A method according to any of claims 32 to 41, wherein a predetermined amount of allowed playback time is credited to the player and after said predetermined amount of allowed playback time of the player has been used an optical storage disk having predetermined audio data recorded thereon is required to be physically presented to said copying system before any further playback time is credited to the player.

20

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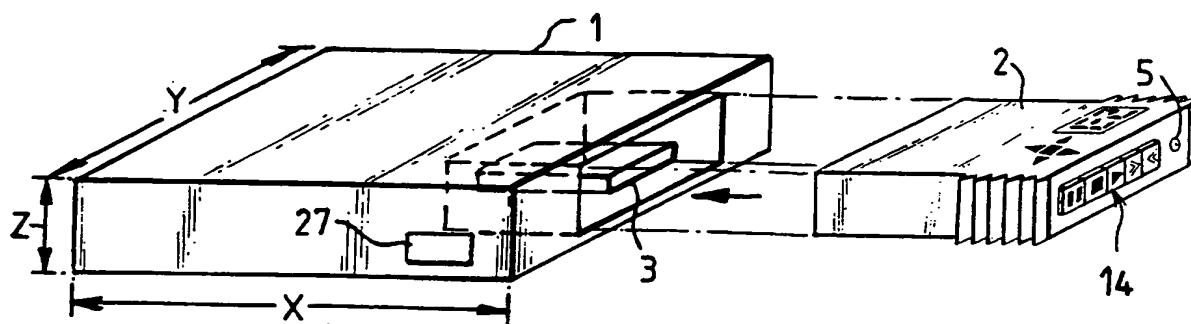


Fig. 1

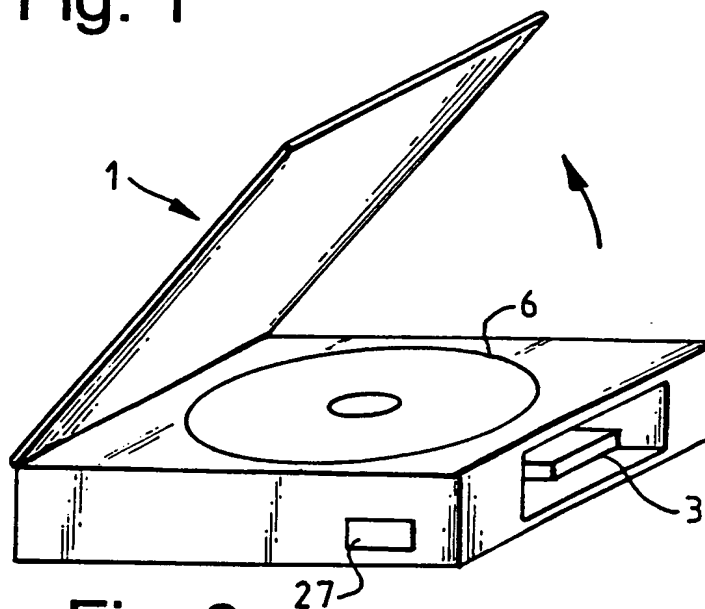


Fig. 2

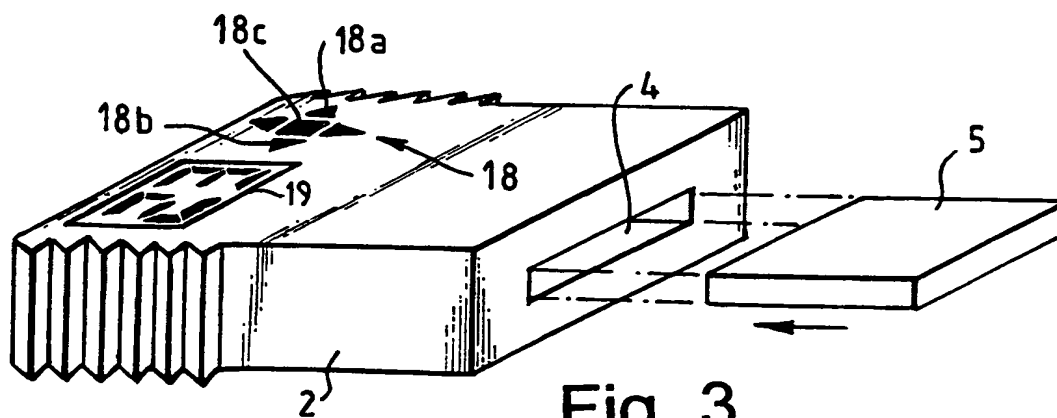
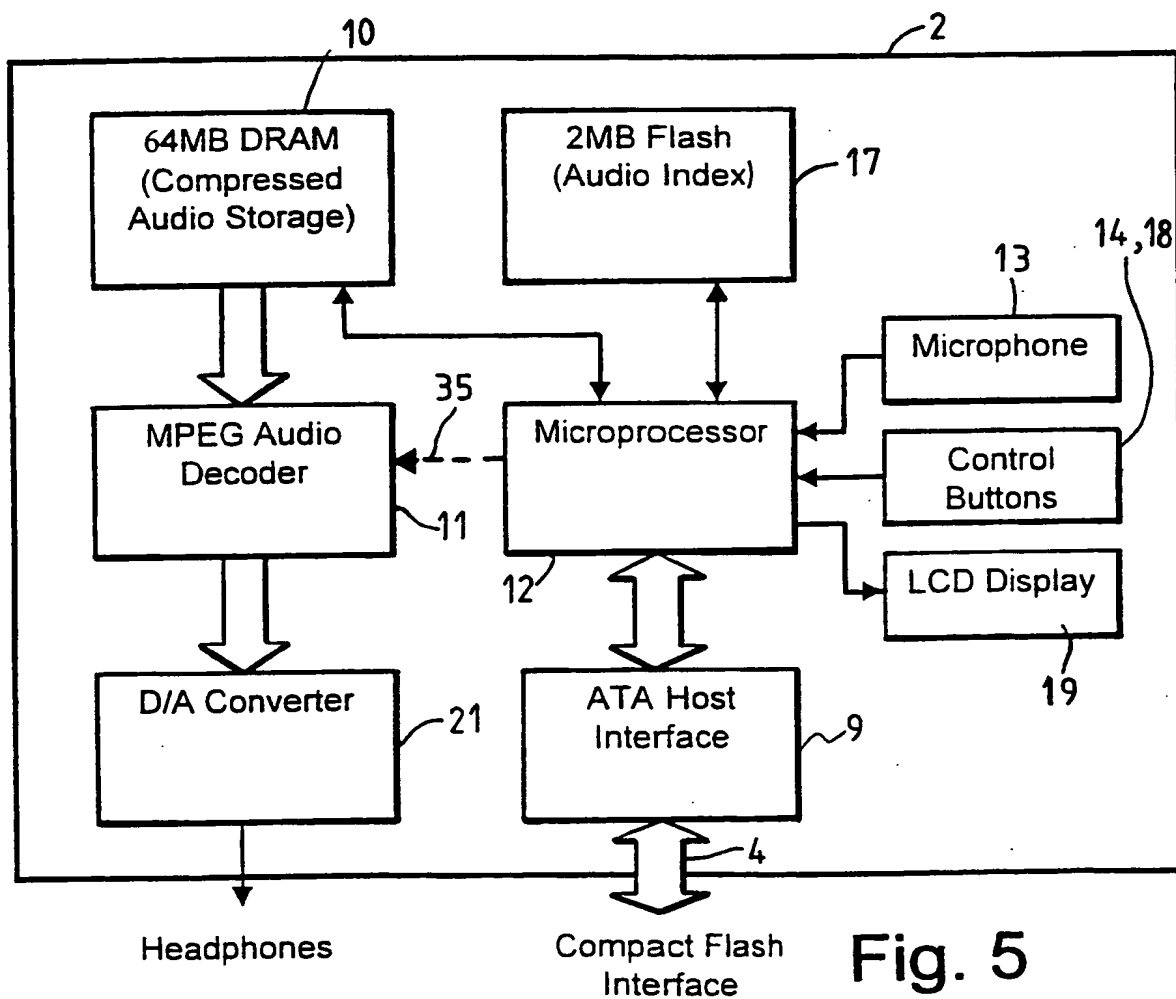
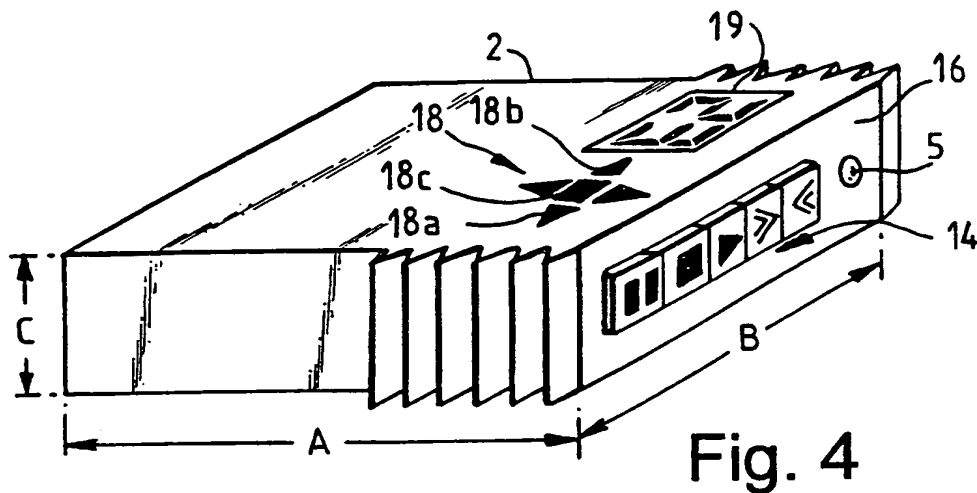


Fig. 3

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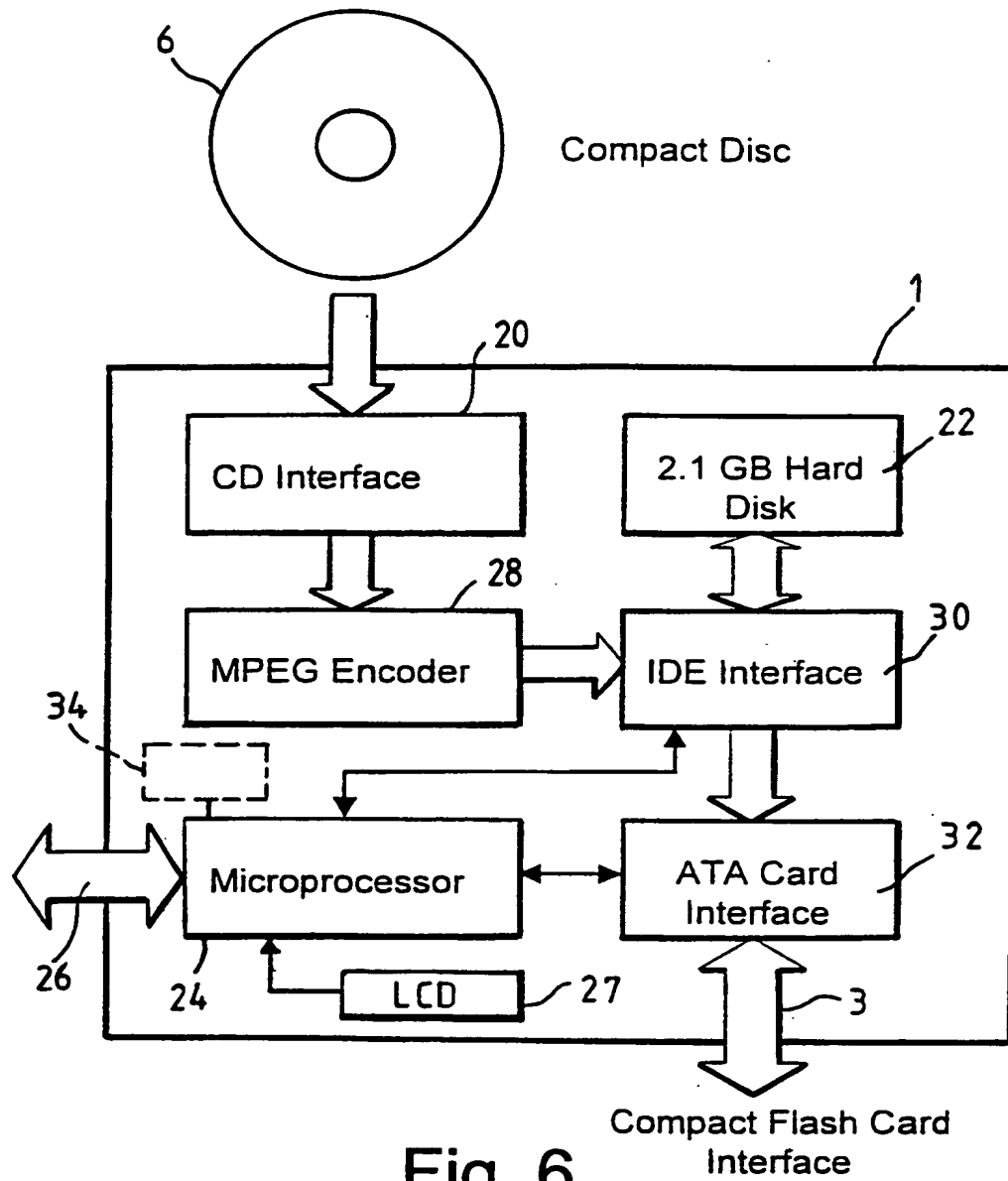


Fig. 6

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/03879

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G11B31/00 G11B25/04 G11C7/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G11B G11C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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A	GB 2 296 600 A (SONY CORP) 3 July 1996 (1996-07-03) abstract; figures 1-3 page 7, line 9 -page 13, line 5 --- -/--	1-30

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

28 January 2000

Date of mailing of the international search report

04/02/2000

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03879

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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International Application No

PCT/GB 99/03879

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